IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

HEALTH DISCOVERY CORPORATION, **Plaintiff,** ***v.*** **INTEL CORPORATION,** **Defendant.**	**6:20-cv-666-ADA**

MEMORANDUM OPINION AND ORDER GRANTING-IN-PART AND DENYING-AS-MOOT-IN-PART INTEL CORPORATION'S MOTION TO DISMISS [ECF No. 12]

Came on for consideration this date is Intel Corporation's Motion to Dismiss (the "Motion"), filed October 19, 2020. ECF No. 12. Health Discovery Corporation ("Plaintiff" or "HDC") filed a response on November 23, 2020, ECF No. 21, to which Intel Corporation ("Defendant" or "Intel") replied on December 7, 2020, ECF No. 25. The Court held a hearing on the Motion on September 28, 2021. *See* ECF No. 57. After careful consideration of the Motion, the Parties' briefs, oral arguments, and the applicable law, the Court **GRANTS-IN-PART** and **DENIES-AS-MOOT-IN-PART** Intel's Motion to Dismiss. The Court **GRANTS** Intel's Motion to the extent it moves to dismiss under 35 U.S.C. § 101 and **DENIES-AS-MOOT** Intel's Motion to the extent it moves to dismiss for a failure to sufficiently plead direct and indirect infringement under Rule 12(b)(6).

I. BACKGROUND

A. Procedural History

On July 23, 2020, HDC filed a complaint accusing Intel of infringing U.S. Patent Nos. 7,117,188 (the "'188 patent"), 7,542,959, 8,095,483, and 10,402,685 (collectively, the "Asserted Patents"). *See* ECF No. 1 ¶¶ 15–18. (HDC states that these patents share a "substantially common

specification," ECF No. 21 at 1 n.1, so this Order's reference to the '188 patent's written description refers to that shared specification.) The complaint states that each of HDC's asserted patents "relate[s] to innovative technology for using learning machines (*e.g.*, Support Vector Machines) to identify relevant patterns in datasets, and more specifically, to a selection of features within the datasets that best enable classification of the data (*e.g.*, Recursive Feature Elimination)." ECF No. 1 ¶ 27. HDC accuses Intel of infringing its patents directly and indirectly through, for example, the use, sale, and marketing of "Intel AI-optimizing/machine learning processors," field programmable gate arrays, system on chips, and software deployed on "Intel/Intel-partnered computers" and other architectures. ECF No. 1 ¶¶ 51, 74, 78.

On October 19, 2020, Intel moved to dismiss HDC's complaint with prejudice under Federal Rule of Civil Procedure 12(b)(6) for asserting claims that are invalid under 35 U.S.C. § 101 and failing to sufficiently plead direct and indirect infringement. *See* ECF No. 12 at 1–2. That Motion is now fully briefed and ripe for judgment.

B. The Asserted Patents

The inventors of the Asserted Patents, Dr. Isabelle Guyon and Dr. Jason Weston, "are widely recognized as being among the most influential scholars in the field" of machine learning. ECF No. 1 ¶ 22. At the time the common specification was drafted, genomic sequencing produced a daunting amount of data—"regarding the sequence, regulation, activation, binding sites and internal coding signals." '188 patent at 2:14–16. But isolating valuable data presented a challenge. *Id.* at 2:16–17. To be sure, traditional methods of data analysis could generate interesting and relevant information, but they could not "intelligently and automatically assist humans in analyzing and finding patterns of useful knowledge." *Id.* at 3:21–23. Human researchers turned to more advanced technology—machine learning algorithms like neural networks, to identify relevant patterns. *Id.* at 3:30–43. Even these produced "crude models of the underlying processes,"

id. at 2:18–22, and were limited by the "curse of dimensionality"—as the dimensions of the data set increased, the processing time and power increased disproportionately, *id.* at 3:65–4:3.

More advanced machine learning technology, like support vector machines ("SVM"), avoided those issues. An SVM:

> maps input vectors into high dimensional feature space through non-linear mapping function, chosen a priori. In this high dimensional feature space, an optimal separating hyperplane is constructed. The optimal hyperplane is then used to determine things such as class separations, regression fit, or accuracy in density estimation.

Id. at 4:5–11. SVMs can process high-dimensionality data sets without concern for the curse of dimensionality. *Id.* at 4:12–20.

But SVMs are not perfect. When a machine learning algorithm like an SVM is trained with only a few training profiles—for example, the gene profiles of a few dozen patients—but each training profile includes a high number of features—"thousands of genes studied in a microarray"—the algorithm risks "overfitting." *Id.* at 25:29–43. That is to say, the SVM will accurately predict patterns for its training profiles but fails to do so when presented with new profiles. *See id.* Addressing this issue requires a reduction in feature size, which may be pursued by ranking features, and eliminating the lowest ranked features. *Id.* at 25:56–26:9. "Previous attempts to address this problem used correlation techniques, i.e., assigning a coefficient to the strength of association between variables." *Id.* at 24:34–37. One specific example using correlation coefficients referred to throughout the patents is that of T.K. Golub. *See, e.g.*, *id.* at 26:20–62.

Recursive feature elimination ("RFE") may be used to reduce features. "RFE methods comprise iteratively 1) training the classifier, 2) computing the ranking criterion for all features, and 3) removing the feature having the smallest ranking criterion." *Id.* at 27:62–66. This iterative process eventually produces nested subsets of features "of increasing informative density." *Id.* at 53:50–60. And these subsets can then be put into an SVM for pattern recognition. *Id.* at 53:61–66.

The asserted patents' claims are directed to performing feature ranking, selection, and reduction using an SVM itself to facilitate an RFE process on a large dataset. The SVM analysis acts as the classifier, producing weight values for each feature in the set, and those values are then used to generate each feature's ranking criterion. *See id.* at 29:12–58. The feature(s) with the smallest ranking criterion are eliminated. *See id.* The process then begins again until a certain number of features remain.

According to the asserted patents' written description, this SVM-RFE method can, relative to prior art methods, "provide subsets of genes that are both smaller and more discriminant." *Id.* at 39:52–54. Discriminant identification is "beneficial in confirming recent discoveries in research or in suggesting avenues for research or treatment." *Id.* at 24:51–60. The written description repeatedly compares conventional gene selection methods with the claimed SVM-RFE method, stating that SVM-RFE "provides the best results down to 4 genes." *Id.* at 49:31–38. It discards "genes that are tissue composition-related and keeps genes that are relevant to the cancer vs. normal separation." *Id.*; *see also id.* at 48:66–11; 49:46–58. Use of the SVM-RFE can "make a quantitative difference . . . with better classification accuracy and smaller gene subset, but [it] also makes a qualitative difference in that the gene set is free of" noise like "tissue composition related genes." *Id.* at 44:31–35. This "[u]se of RFE provides better feature selection than can be obtained by using the weights of a single classifier" and it "consistently outperforms naive ranking, particularly for small feature subsets." *Id.* at 30:8–10; 30:19–23.

II. LEGAL STANDARD

A. Patent Eligibility

Section 101 defines subject matter eligible for patenting as "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35

U.S.C. § 101.[1] The Supreme Court has long read exceptions into § 101: laws of nature, natural phenomena, and abstract ideas are not patentable. *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 185 (1981). According to the Court, these are the fundamental tools of scientific endeavor and granting monopolies over them risks dousing the flame of innovation the U.S. patent regime is meant to fan. *See Gottschalk v. Benson*, 409 U.S. 63, 67 (1972); *Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc.*, 566 U.S. 66, 71 (2012); *see also Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.").

In recent years, divining the bounds of these judicial exceptions has proved increasingly challenging, thanks in large part to the Supreme Court's 2014 decision in *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208 (2014). There the Court established a two-step framework for determining whether a patent claims an ineligible concept. First, determine whether the claims are "directed to" a judicial exception. *Id.* at 217. If so, proceed to the second step and "consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application." *Id.* (omitting quotations).

This framework is "almost impossible to apply consistently and coherently" in the context of abstract ideas. *Smart Sys. Innovations, LLC v. Chi. Transit Auth.*, 873 F.3d 1364, 1377 (Fed. Cir. 2017) (Linn, J., dissenting-in-part and concurring-in-part); *Yu v. Apple Inc.*, 1 F.4th 1040, 1049 (Fed. Cir. 2021) (Newman, J., dissenting) ("In the current state of Section 101 jurisprudence, inconsistency and unpredictability of adjudication have destabilized technologic development in

[1] Because the Court finds that HDC has failed to plead the eligibility of the asserted patents under § 101, it need not reach the other grounds of dismissal under Rule 12(b)(6). The legal standard for those grounds is omitted.

important fields of commerce."). Members from every branch of the federal government have decried the uncertain state of § 101 law and begged guidance from the Supreme Court, Congress, or both. *See CareDx, Inc. v. Natera, Inc.*, No. CV 19-0567-CFC-CJB, 2021 WL 4439600, at *5 (D. Del. Sept. 28, 2021) (collecting quotes from current and former Federal Circuit judges describing the uncertainty infecting § 101 law); *Slyce Acquisition Inc. v. Syte-Visual Conception Ltd.*, No. 6:19-CV-00257-ADA, 2020 U.S. Dist. LEXIS 9451, at *19 (W.D. Tex. Jan. 10, 2020) (same); Brief for United States, *HP Inc. v. Berkheimer*, No. 18-415, 2019 WL 6715368, at *10–13 (Dec. 6, 2019) (responding to call for views of the Solicitor General, requesting the Supreme Court's guidance on patent eligibility standards); Brief for United States, *Hikma Pharms. USA Inc. v. Vanda Pharms. Inc.*, No. 18-817, 2019 WL 6699397, at *13–21 (Dec. 6, 2019) (same). At this point, remarking on the state of eligibility jurisprudence has become hackneyed. It is nevertheless appropriate here, in an Order dismissing a complaint based on close questions arising from caselaw that is difficult to reconcile and apply.

B. Disposition at the Motion to Dismiss Stage

Recent Federal Circuit jurisprudence has hampered courts' authority to issue ineligibility determinations at a case's earliest stages. For example, some opinions recognize that resolution of § 101 motions is inappropriate until after claim construction. *See, e.g.*, *MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1379 (Fed. Cir. 2019). Others have recognized that deciding Rule 12(b)(6) motions invoking § 101 requires factual presumptions favoring non-movants.

In *Aatrix Software, Inc. v. Green Shades Software, Inc.*, for example, the Court acknowledged how factual issues undergird both *Alice* steps. 882 F.3d 1121 (Fed. Cir. 2018). And because a court considering a Rule 12(b)(6) motion must accept a complaint's factual allegations as true, a complaint can recite concrete allegations regarding *Alice*'s underlying factual issues to guard its asserted patents from an early ineligibility determination. *See id.* at 1128; *see also*

Lormand v. U.S. Unwired, Inc., 565 F.3d 228, 232 (5th Cir. 2009) (describing presumptions favoring non-movants in this Circuit); *M-I Drilling Fluids UK Ltd. v. Dynamic Air Ltda.*, 890 F.3d 995, 999 (Fed. Cir. 2018) ("In the procedural posture of a motion to dismiss, a district court must accept the uncontroverted allegations in the plaintiff's complaint as true and resolve any factual conflicts in the affidavits in the plaintiff's favor."). When the complaint contains concrete allegations regarding the "claimed combination's improvement to the functioning of the computer," the asserted patents can survive a Rule 12(b)(6) motion at *Alice* step one. *Aatrix*, 882 F.3d at 1128. And when the complaint contains concrete allegations that "individual elements and the claimed combination are not well-understood, routine, or conventional activity," the asserted patent can survive a Rule 12(b)(6) motion at *Alice* step two. *Id.*

It is also now well established that patents are presumed valid. *See Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 97 (2011). Overcoming that presumption demands clear and convincing evidence, even in the eligibility context. *See Cellspin Soft, Inc. v. Fitbit, Inc.*, 927 F.3d 1306, 1319 (Fed. Cir. 2019). Indeed, any fact "pertinent to the invalidity conclusion must be proven by clear and convincing evidence." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).

In view of these factors, accused infringers invoking § 101 in a Rule 12(b)(6) motion face an uphill scrabble. *See Slyce*, 2020 U.S. Dist. LEXIS 9451, at *14. Intel has been able to surmount these procedural obstacles.

C. Representative Claims

A district court may analyze representative claims for patent eligibility where all of the asserted and challenged claims are substantially similar and linked to the same purported abstract idea. That concept comes from, *inter alia*, *Content Extraction & Transmission LLC v. Wells Fargo Bank, National Association*, 776 F.3d 1343, 1348 (Fed. Cir. 2014) and *Cleveland Clinic Foundation v. True Health Diagnostics LLC*, 859 F.3d 1352, 1360 (Fed. Cir. 2017). This Court

agrees with the Parties that claim 1 of the '188 patent is representative for purposes of this § 101 challenge because it, like the other asserted claims, encapsulates SVM-RFE and recites little, if anything, more than that. *See Content Extraction*, 776 F.3d at 1348; *see also* ECF No. 21 at 10 (HDC conceding that claim 1 of the '188 patent is representative); ECF No. 25 at 2 (same for Intel). Claim 1 is reproduced below:

> 1. A computer-implemented method for identifying patterns in data, the method comprising:
>
> (a) inputting into at least one support vector machine of a plurality of support vector machines a training set having known outcomes, the at least one support vector machine comprising a decision function having a plurality of weights, each having a weight value, wherein the training set comprises features corresponding to the data and wherein each feature has a corresponding weight;
>
> (b) optimizing the plurality of weights so that classifier error is minimized;
>
> (c) computing ranking criteria using the optimized plurality of weights;
>
> (d) eliminating at least one feature corresponding to the smallest ranking criterion;
>
> (e) repeating steps (a) through (d) for a plurality of iterations until a subset of features of pre-determined size remains; and
>
> (f) inputting into the at least one support vector machine a live set of data wherein the features within the live set are selected according to the subset of features.

'188 patent, claim 1.

III. ANALYSIS

A. Claim Construction

The principle that claim construction disputes may bar a patent-eligibility determination at the Rule 12(b)(6) stage, *see MyMail*, 934 F.3d at 1379, is no impediment here where final constructions issued June 3, 2021, *see* ECF No. 51. The Parties also agreed to several

constructions, including construing the representative claim's recitation of SVM to mean "a supervised mathematical learning algorithm that constructs an optimal separating hyperplane based on a subset of a training set and classifies data according to the optimal separating hyperplane." ECF No. 48 at 2.

B. *Alice* Step One

1. Reviewing the Caselaw

At step one, the claims need to satisfy myriad overlapping questions to qualify as a non-abstract concept. For example, do the claims describe an improvement to relevant technology or an abstract idea that uses computers as a tool? Is the "relevant technology" being improved itself an abstract concept? Is the relevant technology the functionality of computers and networks? Do the claims recite a practical application of an abstract concept? Are the claims tied to the physical realm? Are the physical tethers too generic? Do the claims recite the practical application of an abstract idea? And is the practical application or improvement to relevant technology claimed with sufficient specificity?

Recent caselaw examining *Alice*'s first step pays particular attention to whether the claims are directed to a "specific means or method that improves [that] relevant technology."[2] *McRO*, 837 F.3d at 1314. Answering that question commonly turns on the Court's characterization of "the relevant technology." The Federal Circuit has affirmed time and again that claims directed to improvements to the functioning of a computer or network will be found eligible at step one. *See,*

[2] Renewed focus on this question at step one smears the line separating *Alice*'s first two steps. Could a claim recite an inventive concept without presenting a specific means or method for improving relevant technology? The Court need not answer that question today. But the consequences of *Alice*'s eroding border are on display here where HDC's opposition to Intel's Motion posits that all factual allegations supporting eligibility at the first step also support eligibility under the second step.

e.g., *TecSec, Inc. v. Adobe Inc.*, 978 F.3d 1278, 1296 (Fed. Cir. 2020) ("[I]mproving a basic function of a computer data-distribution network, namely, network security."); *Packet Intel. LLC v. NetScout Sys., Inc.*, 965 F.3d 1299, 1310 (Fed. Cir. 2020) ("[A] specific improvement in computer technology: a more granular, nuanced, and useful classification of network traffic."); *Uniloc USA, Inc. v. LG Elecs. USA, Inc.*, 957 F.3d 1303, 1307 (Fed. Cir. 2020) (an "improvement to computer functionality, namely the reduction of latency experienced by parked secondary stations in communication systems."); *Data Engine Techs. LLC v. Google LLC*, 906 F.3d 999, 1009 (Fed. Cir. 2018) ("[A] 'specific' and 'particular' manner of navigating a three-dimensional spreadsheet that improves the efficient functioning of computers.").

In a rarer but growing class of cases, the Court has characterized the relevant technology as some discrete device, system, or method. These claims will also almost certainly be found eligible at *Alice*'s first step. *See, e.g.*, *CardioNet, LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1368 (Fed. Cir. 2020) ("[A]n improved cardiac monitoring device . . . ."); *Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1150 (Fed. Cir. 2019) ("[I]mprovement in an existing technological process (i.e., error checking in data transmissions) . . . ."); *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017) ("[T]he application of physics create an improved technique for measuring movement of an object on a moving platform."); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. 2016) ("[A]llowing computers to produce 'accurate and realistic lip synchronization and facial expressions in animated characters' that previously could only be produced by human animators.").

Yet when the Federal Circuit has characterized the relevant technology as an abstract idea, like a mathematical concept, technique, analysis, or algorithm, the claims will satisfy *Alice*'s first step. *See, e.g.*, *In re Bd. of Trustees of Leland Stanford Junior Univ.*, 991 F.3d 1245, 1251 (Fed.

Cir. 2021) (hereinafter *Stanford II*) ("[M]erely an enhancement to the abstract mathematical calculation of haplotype phase itself."); *In re Bd. of Trustees of Leland Stanford Junior Univ.*, 989 F.3d 1367, 1368 (Fed. Cir. 2021) (hereinafter *Stanford I*); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1168 (Fed. Cir. 2018) ("[T]he focus of the claims is not any improved computer or network, but the improved mathematical analysis.").

The Federal Circuit has not explicitly addressed how to go about characterizing the "relevant technology" the patent-at-issue purports to improve. In hopes of divining guidance, this Court begins its analysis at *Alice*'s first step "by examining previous eligibility determinations." *Genetic Veterinary Scis., Inc. v. LABOKLIN GmbH & Co. KG*, 933 F.3d 1302, 1316 (Fed. Cir. 2019). The Court focuses its review on four recent Federal Circuit opinions: *Stanford II*, *SAP*, *CardioNet*, and *Koninklijke*. In the first two, the Federal Circuit focused on the mathematical nature of the claims to render them invalid under § 101. In the second two, the Federal Circuit deemphasized the mathematical concepts recited in the claims to conclude that the claims survived *Alice* at step one.

In *Stanford II*, the Court held that a patent applicant's claims to a mathematical technique for predicting genetic information were directed to "an enhancement to the abstract mathematical calculation." 991 F.3d at 1250–51. The appealed application described "computerized statistical methods for determining haplotype phase." *Id.* at 1246–47. Haplotype phasing is a process in which a person's genomic sequence data is analyzed to "determine the parent from whom alleles . . . are inherited." *Id.* at 1247. Conventional systems could predict a haplotype phase using algorithms invoking statistical models, like hidden Markov models ("HMMs"). *Id.* But the claimed invention used a particular HMM to allegedly improve the accuracy of the predicted haplotype phase. *Id.*

Claim 1 recites:

> 1. A computerized method for inferring haplotype phase in a collection of unrelated individuals, comprising:
>
> receiving genotype data describing human genotypes for a plurality of individuals and storing the genotype data on a memory of a computer system;
>
> imputing an initial haplotype phase for each individual in the plurality of individuals based on a statistical model and storing the initial haplotype phase for each individual in the plurality of individuals on a computer system comprising a processor a memory [sic];
>
> building a data structure describing a Hidden Markov Model, where the data structure contains:
>
> a set of imputed haplotype phases comprising the imputed initial haplotype phases for each individual in the plurality of individuals;
>
> a set of parameters comprising local recombination rates and mutation rates;
>
> wherein any change to the set of imputed haplotype phases contained within the data structure automatically results in re-computation of the set of parameters comprising local recombination rates and mutation rates contained within the data structure;
>
> repeatedly randomly modifying at least one of the imputed initial haplotype phases in the set of imputed haplotype phases to automatically re-compute a new set of parameters comprising local recombination rates and mutation rates that are stored within the data structure;
>
> automatically replacing an imputed haplotype phase for an individual with a randomly modified haplotype phase within the data structure, when the new set of parameters indicate that the randomly modified haplotype phase is more likely than an existing imputed haplotype phase;
>
> extracting at least one final predicted haplotype phase from the data structure as a phased haplotype for an individual; and
>
> storing the at least one final predicted haplotype phase for the individual on a memory of a computer system.

Id. at 1248.

At *Alice* step one, the Court concluded that the claims were directed to abstract ideas: "the use of mathematical calculations and statistical modeling." *Id.* at 1250. It refused to categorize the purported improvement—increased accuracy in haplotype prediction—as an improvement to a technological process. *Id.* at 1250–51. This was "merely an enhancement to the abstract mathematical calculation of haplotype phase itself." *Id.* In so finding, the Court distinguished *McRO* and *CardioNet*, holding that they "involve practical, technological improvements extending beyond improving the accuracy of a mathematically calculated statistical prediction." *Id.* at 1251.

Similarly, in *SAP*, the Federal Circuit affirmed a Rule 12(c) decision finding U.S. Patent No. 6,349,291 (the "'291 patent") ineligible under § 101. 898 F.3d at 1166. The '291 patent is directed to systems and methods for performing "certain statistical analyses of investment information." *Id.* at 1161. According to the '291 patent, conventional financial sites performed "rudimentary statistical functions" that relied upon the assumption that the underlying probability distribution function ("PDF") for relevant financial data follows a "normal or Gaussian distribution." *Id.* at 1163. The '291 patent's inventors rejected that assumption, finding that it "understate[d] the true risk and overstate[d] [the] potential rewards for an investment or trading strategy." *Id.* at 1164. They proposed, instead, a technique utilizing "resampled statistical methods for the analysis of financial data" that does not assume a normal probability distribution. *See id.* "One such method is a bootstrap method, which estimates the distribution of data in a pool (sample space) by repeated sampling of the data in the pool." *Id.*

Claim 1 of the '291 patent recited the following:

> 1. A method for calculating, analyzing and displaying investment data comprising the steps of:
>
> (a) selecting a sample space, wherein the sample space includes at least one investment data sample;

> (b) generating a distribution function using a re-sampled statistical method and a bias parameter, wherein the bias parameter determines a degree of randomness in a resampling process; and,
>
> (c) generating a plot of the distribution function.

According to the Federal Circuit, claim 1 was directed to abstract ideas, like "selecting certain information, analyzing it using mathematical techniques, and reporting or displaying the results of the analysis." *Id.* at 1167. At step one, the Court distinguished *McRO* and *Thales* by referencing improvements tied to the "physical." *Id. McRO*'s invention was directed to the display of "animated characters on screens for viewing by human eyes." *Id.* In *Thales*, the invention used mathematics to improve a "physical tracking system." *Id.* at 1168 (citing *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1348–49 (Fed. Cir. 2017)). In contrast, *SAP*'s appealed claims focused on an "improvement in a mathematical technique," not "a physical-realm improvement." *Id.* at 1167–68. It was of no moment that the mathematical technique worked upon "real investments." *Id.* at 1158.

In *CardioNet*, the Federal Circuit reversed a decision from the U.S. District Court for the District of Massachusetts holding U.S. Patent No. 7,941,207 (the "'207 patent") ineligible under § 101 at the motion to dismiss stage. 955 F.3d at 1358. Independent claim 1 of the'207 patent recites:

> 1. A device, comprising:
>
> a beat detector to identify a beat-to-beat timing of cardiac activity;
>
> a ventricular beat detector to identify ventricular beats in the cardiac activity;
>
> variability determination logic to determine a variability in the beat-to-beat timing of a collection of beats;
>
> relevance determination logic to identify a relevance of the variability in the beat-to-beat timing to at least one of atrial fibrillation and atrial flutter; and

> an event generator to generate an event when the variability in the beat-to-beat timing is identified as relevant to the at least one of atrial fibrillation and atrial flutter in light of the variability in the beat-to-beat timing caused by ventricular beats identified by the ventricular beat detector.

Id. at 1365. This claim does not detail how the claimed device's components go about their detecting, determining, or identifying steps. *See id.*

At *Alice* step one, "the district court concluded that the claims are directed to the abstract idea that atrial fibrillation and atrial flutter 'can be distinguished by focusing on the variability of the irregular heartbeat.'" *Id.* at 1366 (quoting *CardioNet, LLC v. InfoBionic, Inc.*, 348 F. Supp. 3d 87, 93 (D. Mass. 2018)). The '207 patent's written description alleged that the patented device is well-adapted to ambulatory patients and reported fewer false negatives and false positive for atrial fibrillation and atrial flutter, all using "minimal computational resources." *See id.* at 1366. (Unlike the other cases examined in this Order, the *CardioNet* opinion did not discuss the appealed patent's description of conventional systems.) The district court rejected the plaintiff's argument that the claimed invention is "not directed to an abstract idea because it 'represents an improvement to the function of cardiac monitoring devices.'" *See id.* (quoting *CardioNet*, 348 F. Supp. 3d at 93).

The Federal Circuit was more receptive, holding that, "[w]hen read as a whole, and in light of the written description," claim 1 is directed to "an improved cardiac monitoring device," not an abstract idea. *Id.* at 1368. The written description explained how calculating "variability in the beat-to-beat timing" and then relating it to atrial fibrillation and atrial flutter achieves "multiple technological improvements." *Id.* For example, the claimed device "more accurately detects the occurrence of atrial fibrillation and atrial flutter" distinct from other arrhythmias, while avoiding false positives and false negatives. *Id.* at 1368–69. It also renders the device capable of identifying "sustained episodes of atrial fibrillation and atrial flutter that have 'increased clinical significance.'" *Id.* at 1369. In sum, the asserted claims were "directed to a specific technological

improvement." *Id.* The written description confirmed as much by reporting the myriad advantages of the claimed device. *Id.*

The Federal Circuit attributed error to the district court for "analogizing the '207 patent claims to certain ineligible 'computer implemented claims for collecting and analyzing data to find specific events.'" *Id.* at 1371. This oversimplified the claims by failing to account for their specific limitations. *Id.* (citing *McRO*, 837 F.3d at 1313). The opinion continued, noting how the claims did not focus on "certain independently abstract ideas that use computers as tools," but rather "fit into the class of claims that focus on 'an improvement in computers [and other technologies] as tools.'" *Id.* (quoting *SAP*, 898 F.3d at 1168 (brackets in original)). The Court did not expound upon this distinction beyond pointing to the improvements identified above.

Finally, in *Koninklijke*, the Federal Circuit reversed a Rule 12(c) decision holding U.S. Patent No. 6,212,662 (the "'662 patent") ineligible. 942 F.3d at 1150. The '662 patent was directed to an improved system of detecting errors during data transmission. Conventional systems achieved such detection using a fixed generating function that receives transmission data and then returns "check data." *Id.* at 1146. This fixed function generates check data at the transmission source and again at the transmission destination before comparing the two. *Id.* Any difference between the destination check data and the source check data indicates that the transmitted data was corrupted during transmission. *Id.*

This arrangement was not faultless. Conventional systems threw false negatives: the transmission data arrived at its destination with errors, but the source and destination check data nevertheless matched. *Id.* at 1146–47. The '662 patent identified the cause: the fixed generating function. *Id.* at 1147. The generating function was systematically failing to return destination check data reflecting certain patterns of errors. *Id.* If a fixed generating function fails to return check data

reflecting a certain pattern of corruption, the persistent use of that function systematically fails to identify those patterns. *Id.* at 1146–47. The '662 patent proposed a solution: vary how the system generates check data over time. *Id.* Claim 2 of the '662 patent recites a specific implementation wherein the transmission data is fed into the generating function in a slightly modified permutation, and the particular permutation periodically changes. *Id.*

Claims 1 and 2 of the '662 patent recite:

> 1. A device for producing error checking based on original data provided in blocks with each block having plural bits in a particular ordered sequence, comprising:
>
> a generating device configured to generate check data; and
>
> a varying device configured to vary original data prior to supplying said original data to the generating device as varied data;
>
> wherein said varying device includes a permutating device configured to perform a permutation of bit position relative to said particular ordered sequence for at least some of the bits in each of said blocks making up said original data without reordering any blocks of original data.
>
> 2. The device according to claim 1, wherein the varying device is further configured to modify the permutation in time.

At *Alice*'s first step, the Federal Circuit held that claim 2 is "patent-eligible because [it is] directed to a non-abstract improvement in an existing technological process (i.e., error checking in data transmission)." *Id.* at 1150. Indeed, the accused infringer did "not dispute that varying the way check data is generated provides an improvement to an existing technological process." *Id.* 1151. The opinion distinguished prior cases holding claims directed to abstract "data manipulation." *Id.* at 1152. It criticized those claims for not "recit[ing] a specific enough solution to make the asserted technological improvement concrete." *Id.* In contrast, the appealed claims in *Koninklijke* described how the data was processed "(by reordering information via permutation)" and "how this permutation is used (i.e., modifying the permutation applied to different data

blocks)." *Id.* at 1153. And because the claims captured "this specific implementation," which constitutes "a key insight to enabling prior art error detection systems to catch previously undetectable systematic errors," the claims were not directed to an abstract idea. *Id.*

2. Reconciling the Caselaw

It is difficult to extract a unified theory of *Alice*'s first step from these four cases (much less from the whole of Federal Circuit § 101 jurisprudence). Efforts to reconcile these opinions illustrate the difficulty in applying *Alice* with any consistency.

In *CardioNet*, the Court drew a line separating (a) claims like those in *SAP* "focus[ing] on 'certain independently abstract ideas that use computers as tools,'" and (b) claims like those in *CardioNet* focusing on an improvement in a technology as a tool. 955 F.3d at 1371 (quoting *SAP*, 898 F.3d at 1168). Yet the claims in both cases merely "select[ed] certain information, analyz[ed] it using mathematical techniques, and report[ed] or display[ed] the results of the analysis." *SAP*, 898 F.3d at 1167. In *SAP*, the information collected and analyzed was financial data. In *CardioNet*, it was "beat-to-beat variability in heart rate over a series of successive heartbeats." 955 F.3d at 1362; *see also id.* at 1379 n.3 (quoting the patent owner as characterizing the claims as invoking algorithms). The Court did not sufficiently explain why *CardioNet* fell on one side of the line, and *SAP* on the other.

This Court will not so easily lay the disparate results of these two cases at the feet of differing subject matter. But other distinctions prove unproductive. For example, the claims in *CardioNet* are directed to a device while two of *SAP*'s claims recite methods. In theory, the device tethers the claims to "something physical," a distinction *SAP* raised to explain why the claims in *McRO* and *Thales* survived. 898 F.3d at 1167–68. Yet *SAP* also involved a system claim; the Court only acknowledged the system's tangibility at *Alice*'s second step, sweeping it aside. 898 F.3d at 1170. But as the Federal Circuit has clarified elsewhere, directing a claim to a physical device—

for example, a digital camera—does not necessarily support a finding of eligibility at step one where the device "is simply a generic environment in which to carry out the abstract idea." *Yu v. Apple Inc.*, 1 F.4th 1040, 1043–44 & n.2 (Fed. Cir. 2021). In this Court's opinion, the claimed components in *CardioNet* are not any less generic than those claimed in *Yu*. Yet *CardioNet*'s claims were deemed patent eligible; not so for the claims in *Yu.*

Nor should it matter that the claimed device of *CardioNet* analyzes heart-beat data. As the *SAP* Court held, "even if a process of collecting and analyzing information is 'limited to particular content' or a particular 'source,' that limitation does not make the collection and analysis other than abstract." 898 F.3d at 1168 (quoting *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350, 1353, 1355 (Fed. Cir. 2016)).

Stanford II and *Koninklijke* are also difficult to square. In both cases the claims were directed to data manipulation. In *Stanford II*, the relevant data was genomic information used to predict a haplotype phase. In *Koninklijke*, the relevant data was transmission and check data used to predict errors in a transmission. The Federal Circuit deemed only the former claims abstract, noting how the *Stanford II* claims could not be characterized as embodying a "practical application" because they did not recite any "application, concrete or otherwise, beyond storing the haplotype phase." 991 F.3d at 1250. But the same error was not dispositive in *Koninklijke*. 942 F.3d at 1151. The Court explained:

> A claim that is directed to improving the functionality of one tool (e.g., error checking device) that is part of an existing system (e.g., data transmission error detection system) does not necessarily need to recite how that tool is applied in the overall system (e.g., perform error detection) in order to constitute a technological improvement that is patent-eligible

Id. The opinion continued by instructing courts to focus on whether the claims recite a "specific means or method that improves the relevant technology," as opposed to merely a result or effect. *Id.* (quoting *McRO*, 837 F.3d at 1314). The *Stanford II* Court ignored that instruction.

Guided only by *Koninklijke* and *CardioNet*, the Court would likely uphold the claims here at *Alice*'s first step. But *SAP* and *Stanford II*—which deal with subject matter much closer to that at issue here—preclude that outcome. Given the inconsistency riddling § 101 jurisprudence, a district court's surest guidance rises from cases analyzing patents most like those under review. *Cf. Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016) ("[B]oth this court and the Supreme Court have found it sufficient to compare claims at issue to those claims already found to be directed to an abstract idea in previous cases."). With that in mind, *Stanford II* is this case's North Star, with *SAP* nearby.

3. Applying *Stanford II* and *SAP* at Step One

The Court, therefore, follows *Stanford II* and *SAP* in finding that representative claim 1 satisfies *Alice*'s first step.[3] Like the patents in *Stanford II* and *SAP*, the asserted patents' written description merely describes improving a mathematical analysis. In *Stanford II*, *SAP*, and the instant Action, the patents' written description characterizes conventional systems as invoking mathematical analyses that the claimed inventions merely improve. In *Stanford II*, the patent application explained how the claimed invention used a particular type of HMM to improve accuracy of the haplotype prediction. 991 F.3d at 1246. Conventional methods used other statistical models (including different HMMs). *Id*. In *SAP*, the patent described how the claimed invention modified the underlying probability distribution function of conventional methods to

[3] HDC's attempt to distinguish *SAP* based on its subject matter, "automating general business or financial processes," ECF No. 21 at 14, is unpersuasive, especially in view of *Stanford I* and *II*, which issued after HDC filed its opposition.

reflect the risk and reward for certain investments more accurately. 898 F.3d at 1161. The *Stanford II* and *SAP* Courts held that the claimed methods' production of improved data relative to conventional mathematical methods could not render the claims eligible; the claims only amounted to an "improvement in wholly abstract ideas—the selection and mathematical analysis of information." *SAP*, 898 F.3d at 1168; *Stanford II*, 991 F.3d at 1251 ("[I]t is merely an enhancement to the abstract mathematical calculation of haplotype phase itself.").

Here, the written description explained how conventional methods reduced feature size in data sets by ranking and eliminating features based on, for example, correlation coefficients, whereas the claimed invention ranks and eliminates features using SVM-RFE, a purportedly novel but nevertheless mathematical technique. *See* '188 patent at 29:12–58. According to the written description, this feature-reduction method could produce subsets of genes that are smaller, more discriminant, and less burdened with noise. *See id.* at 24:51–60; 48:66–11; 49:46–58; 44:31–35. Like the claims in *Stanford II* and *SAP*, the claims here merely produce data with improved quality relative to that produced by conventional mathematical methods. (And this assumes that all the asserted claims even capture these improvements.) So, taking the allegations in HDC's complaint as true, the asserted claims merely improve or "enhance" an abstract idea. These claims, then, like the *Stanford II* and *SAP* claims, satisfy *Alice*'s first step.

HDC disagrees, asserting that its complaint, including the patents attached thereto, recite allegations directed to "improving an existing technological or computer functionality." ECF No. 21 at 9. According to the HDC, the representative claim sets forth myriad "inventive features" rendering its claims patent eligible at either *Alice* step. *Id.* at 12. HDC's opposition reproduces several excerpts of the written description, but each merely describes how RFE functions, not how SVM-RFE improves upon the prior art. With one exception. One excerpt states: "To increase

computational speed, RFE is preferably [sic] implemented by training multiple classifiers on Subsets of features of decreasing size." *Id.* at 12 (quoting '188 patent at 30:3–6). HDC fails to excerpt the beginning of that passage, which clarifies that, "[i]n general, RFE is computationally expensive when compared against" conventional methods that used correlation coefficients. '188 patent at 29:63–64. The Court finds, then, that this excerpt does not allege an improvement over convention. Moreover, "precedent is clear that merely adding computer functionality to increase the speed or efficiency of the process does not confer patent eligibility on an otherwise abstract idea." *Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1370 (Fed. Cir. 2015).

The Court concludes, therefore, that *Alice*'s first step is satisfied because the claims are directed to the abstract mathematical concept of SVM-RFE.[4] The Court is reticent to scour representative claim 1 of all specificity so that only a "mathematical concept" remains. But HDC has essentially conceded this characterization, stating that the asserted claims are directed to SVM-RFE, ECF No. 21 at 1, which it labels "an application" of SVM, itself a concededly "mathematical algorithm[]," ECF No. 1 ¶¶ 28, 29. Layering RFE—itself an abstract concept—onto SVM to produce "SVM-RFE" does not raise either concept above the level of an abstract idea. *See, e.g.*, *Ubiquitous Connectivity, LP v. City of San Antonio*, No. SA-18-CV-00718-XR, 2019 U.S. Dist. LEXIS 165197, at *22 (W.D. Tex. Sep. 26, 2019) ("The fact that the patents combine two abstract concepts . . . does not render them non-abstract."). Nor does the iterative nature of RFE. *See*

[4] The Court is also cognizant of real preemption concerns implicit in many of the asserted claims, which are "not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use." *Gottschalk v. Benson*, 409 U.S. 63, 64 (1972); *see also McRO*, 837 F.3d at 1314("The preemption concern arises when the claims are not directed to a specific invention and instead improperly monopolize 'the basic tools of scientific and technological work.'" (quoting *Alice*, 573 U.S. at 216)). This concern is particularly relevant to representative claim 1, which is not limited to the field of genetics (which the written description focuses on).

Content Extraction, 776 F.3d at 1348–49 ("repeating some steps" is not inventive). Because *Alice*'s first step is satisfied, the Court will proceed to the second.

C. *Alice* Step Two

Alice's second step requires examining "the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." 573 U.S. at 221 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72, 80 (2012)). The second step is satisfied when the claim limitations "involve more than performance of 'well-understood, routine, [and] conventional activities previously known to the industry.'" *Content Extraction*, 776 F.3d at 1347–48. And whether "the claim elements or the claimed combination are well-understood, routine, conventional is a question of fact." *Aatrix*, 882 F.3d at 1128.

HDC's complaint fails to allege an inventive concept. As an initial matter, the argument that the claimed invention improves data quality, such as the optimum error rate, relative to conventional methods is just as unpersuasive at this step as it was at the first. "That a specific or different combination of mathematical steps yields more accurate [data] than previously achievable under the prior art is not enough to transform the abstract idea in claim 1 into a patent eligible application." *Stanford II*, 991 F.3d at 1252; *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) ("Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible."). The Court is also not persuaded by HDC's allegations that SVM-RFE is "important," utilized across a "broad spectrum of application," and the original academic paper describing SVM-RFE has been cited more than eight thousand times. ECF No. 21 at 8. Even if true, these allegations cannot salvage the claims. As the *SAP* Court held, a

mathematical idea can be novel and even a "groundbreaking" advance and still not be patent eligible. 898 F.3d at 1170.

Nor is this Court persuaded by any additional limitations or allegations. This Court is, like the *SAP* Court, willing to find the claims eligible at step two if the plaintiff could "plausibly allege[] innovation in the non-abstract application realm." *Id.* at 1163. But it cannot discern any such allegations capable of moving "the claims out of the realm of abstract ideas." *Id.* at 1169. In *SAP*, it was not enough: that the claims were limited to a particular field of invention, like investment information; that claims limited the recited resampling methods to a particular species of mathematical method; or that claims required generic databases and processors instead of "improved computer resources." *See id.* at 1169–70.

This Court is of the same mind. It is of no moment that some asserted claims are limited to a particular field of invention or input data, like "gene expression data" or "biologic data." *See, e.g.*, '188 patent at claims 8, 13-23; '959 patent at claims 1-11; '483 patent at claims 5, 17, 36; *see also generally Stanford II*; *Stanford I*. Nor is it of any significance that some of the mathematical steps are performed with more specificity. Nor that several claims require a generic computer to perform the SVM-RFE process. Limitations to generic printers or generic media display the results of SVM-RFE is, as Intel notes, "[i]nsignificant extra-solution activity," which cannot constitute an inventive concept. *Data Engine Techs.*, 906 F.3d at 1012.

The Court concludes, then, that HDC has failed to plead allegations supporting the eligibility of the asserted claims. Intel asks that this Court dismiss HDC's complaint with prejudice. But as one of our sister courts has recently explained:

> There is a wide gulf between a Defendant affirmatively showing by clear and convincing evidence that claims are ineligible under both steps of the *Alice* inquiry and a Plaintiff failing to plead adequate facts addressing the analytical steps called for in *Alice*. Hence while

> this complaint must fall under the analysis required by Rule 12(b)(6) its failure should be without prejudice, rather tha[n] with prejudice.

Mad Dogg Ath., Inc. v. Peloton Interactive, Inc., No. 2:20-CV-00382-JRG, 2021 U.S. Dist. LEXIS 174960, at *21 (E.D. Tex. Sep. 15, 2021). This Court agrees and will therefore dismiss HDC's claims, but it will do so without prejudice.

IV. CONCLUSION

In light of the foregoing, and for the reasons stated herein, the Court finds that Intel's Motion should be and hereby is **GRANTED-IN-PART** and **DENIED-AS-MOOT-IN-PART** without prejudice. The Court **GRANTS** Intel's Motion to the extent it moves to dismiss HDC's claims under 35 U.S.C. § 101, but does so without prejudice. The Court further **DENIES-AS-MOOT** Intel's Motion to the extent it moves to dismiss for a failure to sufficiently plead direct and indirect infringement under Rule 12(b)(6). It is therefore **ORDERED** that all claims in the above-captioned matter are **DISMISSED WITHOUT PREJUDICE**. The Clerk of the Court is directed to **CLOSE** the above-captioned matter.

SIGNED this 27th day of December, 2021.

ALAN D ALBRIGHT
UNITED STATES DISTRICT JUDGE